

REMARKS/ARGUMENTS

Claims 34, 41-45, 48, 63, 66, 67, and 70 are amended, and claims 81-91 are newly added. In addition, claims 1-33, 39, 40, 49-62, 64, 65, and 71-80 are canceled. Applicants respectfully request reexamination and reconsideration of the application.

The specification was objected to. In response, Applicants have amended the specification. Applicants were not able to find a blank on page 1, line 5 or elsewhere in the specification. Applicants note that the specification was amended by the Preliminary Amendment filed on October 23, 2003, and that amendment may have addressed at least some of the Examiner's concerns regarding the specification. Applicants thus believe that all objections to the specification have been addressed.

The drawings were objected to. After careful consideration of the suggestion to amend Figure 7, Applicants believe it best not to amend Figure 7 for the following reasons.

First, the suggested amendment would be inconsistent with the description of Figure 7 in the specification, which describes the "larger substrate 706" as a generic representation intended to illustrate the broad scope and varied applications of the invention. Although the specification states that, in one example, substrate 706 may be the space transformer of a probe card assembly, the specification also describes another example in which substrate 706 is a semiconductor wafer and elements 704 are die sites. The suggested amendment to Figure 7—in which a semiconductor wafer is added above probes 710—may not be consistent with the example in which substrate 706 is a semiconductor wafer.

Second, Figures 11A-11C already illustrate exemplary tiles-to-wafer relationships. For example, in Figure 11A, an exemplary, nonlimiting relationship between tiles 1102 and wafer 1110 is shown. Similar exemplary relationships are shown between tiles 1122a-c and wafer 1130 in Figure 11B and tiles 1142a-f and wafer 1150 in Figure 11C.

For the foregoing reasons, Applicants request that the objection to the drawings be reconsidered and withdrawn.

Claims 34-38 and 63 were rejected under the judicially created doctrine of obviousness-type double patenting in view of claim 2 of US Patent No. 6,050,829 to Eldridge et al. ("Eldridge"). As discussed below, independent claims 34 and 63 are amended to include features from dependent claims that were not rejected under the judicially created doctrine of obviousness-type double patenting, which moots this rejection.

The non-elected claims are canceled, as requested.

Claims 67, 75, and 80 were objected to. Applicants believe that the amendment to claim 67 moots the Examiner's concern, and claims 75 and 80 are canceled.

Claims 36-45 and 64-67 were rejected under 35 USC § 112, second paragraph as indefinite. Claims 39 and 64 are canceled, which moots the rejection of claims 39 and 64-67. Applicants traverse, however, the rejection of claims 36-38 and 40-45 on the grounds that an improper test was applied to those claims.

Claims 36-38 and 40-45 were rejected because independent claim 34 reads on Figure 5 of the specification but claims 36-38 and 40-45 allegedly do not. The second paragraph of section 112, however, does not require that every dependent claim read on every embodiment that the independent claim reads on. In fact, it is permitted—and indeed common practice—for an independent claim to be drafted broadly to read on multiple embodiments and for dependent claims to be drafted more narrowly and therefore read on fewer embodiments than the independent claim. Thus, assuming only for the purpose of argument that claim 34 does in fact read on Figure 5 but claims 36-38 and 40-45 do not, that alone does not establish that any of the claims are indefinite under 35 USC § 112, second paragraph or that any of claims 36-38 and 40-45 are inconsistent with claim 34.

The test for determining whether any claim complies with 35 USC § 112, second paragraph is whether the scope of the claim is reasonably clear. (MPEP § 2173.) That is, if the scope of a claim is reasonably clear, the claim complies with 35 USC § 112, second paragraph. The scope of claims 36-38 and 40-45 is clear, and in fact, there does not appear to be an assertion in the Office Action that the scope of those claims is not clear. Therefore, claims 36-38 and 40-45 comply with 35 USC § 112, second paragraph, and the rejection should be withdrawn.

To clarify the record, Applicants note that claim 34 is not limited to the exemplary embodiment shown in Figure 5 but is much broader. Indeed, claim 34 covers other embodiments, including alternative configurations of the probe card assembly of Figure 5. As just one of many possible examples, the specification states that the space transformer 506 shown in Figure 5 may be replaced by a space transformer comprising a larger substrate to which are attached one or more tiles. Thus, space transformer 506 of Figure 5 may be replaced by, for example, the large-substrate/tile structures shown in, without limitation, Figures 5B, 6, 6A, 7, 9A-9D, and 11A-11C.

Thus, in one example, claim 34 reads not only on Figure 5 as depicted but also reads on a modified Figure 5 in which space transformer 506 is replaced with, for example, space transformer 622 to which tiles 600 are attached (see Figure 6A), in which case a tile 600 corresponds to the first substrate of claim 34 and element 622 corresponds to the second substrate. Claims 36-38, and 40-45 are compatible with such an embodiment as well as other—but not necessarily all—embodiments and variations upon which claim 34 may read. (Claim 34 also reads on other embodiments disclosed in the specification as well as many variations and alternative embodiments.)

Also to clarify the record, claim 34 is not limited to the manner in which claim 34 was read onto Figure 5 in the Office Action. As one example of an alternative manner of reading claim 34 onto Figure 5, the first substrate of claim 34 reads on the space transformer 506 of Figure 5, and the second substrate of claim 34 reads on the interposer 504 of Figure 5. Indeed, such an alternative reading of claim 34 onto Figure 5 avoids many of the issues raised in the Office Action with regard to claims 36-38 and 40-45.

Claims 34-39, 46, 47, 48, 63-65, 68-70, 75, 80 were rejected in view of one or more of US Patent No. 5,635,846 to Beaman et al. ("Beaman '846"), US Patent No. 5,371,654 to Beaman et al. ("Beaman '654"), US Patent No. 4,932,883 to Hsia et al. ("Hsia"), and US Patent No. 5,534,784 to Lum et al. ("Lum"). Applicants respectfully traverse these rejections.

Claims 44, 45, 48, 66, 67, and 70 were identified in the Office Action as containing subject matter that patentably distinguishes over the prior art of record, including Beaman '846, Beaman '654, Hsia, and Lum. Claims 41 and 42 describe features that are similar to the features of claims 66 and 67. Consequently, claims 41 and 42 would appear also to contain subject matter that patentably distinguishes over the prior art of record.

Independent claim 34 is amended to include, in the alternative, the features of claims 41, 42, and 45, as well as features from intervening claims. Independent claim 48 is rewritten in independent form, including the features of intervening claims. Independent claim 63 is amended to include, in the alternative, the features of claims 66 and 67, as well as features from intervening claims. Independent claim 70 is rewritten in independent form, including the features of intervening claims. Independent claims 34, 48, 63, and 70 are now, therefore, presumably allowable over the prior art of record.

Claims 25-38 and 41-47 depend from independent claim 34, and claims 66-69 depend from independent claim 63. Claims 25-38, 41-47, and 66-69 are therefore also allowable over the prior art of record.

New independent claim 81 describes an "interconnect structure" in which probes for making electrical connections with an electronic device to be tested are attached to a plurality of "first substrates." The first substrates are attached to a "second substrate" such that the probes attached to the first substrates are disposed in a pattern that corresponds to input/output terminals of the electronic device. None of the prior art references of record alone or in combination teach or suggest a test apparatus in which the probes for probing an electronic device under test are distributed over a plurality of substrates each of which is attached to another (typically larger) substrate.

The use of multiple such first substrates provides significant advantages over a prior art test system in which all of the probes for contacting an electronic device are disposed on one substrate. For example, if just one of the probes 42 of Beaman 846 breaks, either the broken probe must be individually removed and replaced or the entire probe head 40 must be replaced. Because of the typically small size and dense configuration of probes 42 used to probe a semiconductor wafer 50, removing and replacing one tiny probe 42 is usually prohibitively difficult and expensive. Consequently, the typical remedy for even one broken probe 42 is to replace the entire probe head 40 and therefore replace all of probes 42 even though only one is broken.

In contrast, if one probe of the interconnection structure of claim 81 breaks, the broken probe can be repaired by removing and replacing the one first substrate to which the broken probe is attached. All of the probes on the other first substrate(s) need not be disturbed or replaced. Needless to say, replacing one substrate that comprises only part of the probes is faster, cheaper, and more efficient than replacing a larger substrate to which all of the probes are attached (e.g., probe head 40 with probes 42 in Beaman '846).

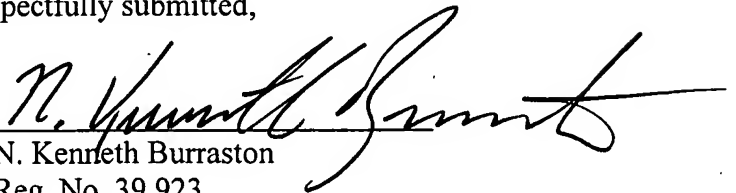
New independent claim 81 thus patentably distinguishes over the prior art of record. New claims 82-91 depend from claim 81 and are therefore also patentable.

In view of the foregoing, Applicants submit that all of the claims are allowable and the application is in condition for allowance. If the Examiner believes that a discussion with Applicants' attorney would be helpful, the Examiner is invited to contact the undersigned at (801) 323-5934.

Respectfully submitted,

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